

Claims

1. A storage media management apparatus to and from which a plurality of storage media are connected and disconnected, comprising:

5        a dividing unit operable to divide a content into a plurality of content parts, for storing the content as being divided into a plurality of storage media;

10        a management information generating unit operable to generate a plurality of pieces of management information in correspondence to the content parts, each piece of management information including (a) reconstruction information for reconstructing the content by concatenating a corresponding content part with the other content parts, and (b) individual information for making the corresponding content part  
15 individually usable;

      a writing unit operable to write each content part together with a corresponding piece of management information, to a different one of the storage media; and

20        a reconstruction judging unit operable, when a content part stored in one of the storage media is to be used, to judge whether the content is to be reconstructed and made usable, or the content parts are to be individually made usable, based on the piece of management information stored in each storage medium.

2. The storage media management apparatus of Claim 1,  
further comprising:

a reading unit operable to read the pieces of management  
information from storage media that have been connected; and

5 a program information generating unit operable to  
generate, based on reconstruction information included in each  
piece of management information read by the reading unit,  
reconstruction program information for presenting the content  
as one program, when the reconstruction judging unit judges  
10 that the content is to be reconstructed and made usable.

3. The storage media management apparatus of Claim 2,  
wherein

the reconstruction judging unit judges that the content  
15 parts are to be individually made usable, when the reading unit  
fails to read any of the pieces of management information, and

the program information generating unit generates, for  
each piece of management information read by the reading unit,  
individual program information for presenting a corresponding  
20 content part as an individual program, when the reconstruction  
judging unit judges that the content parts are to be individually  
made usable.

4. The storage media management apparatus of Claim 2,  
25 wherein

the reconstruction judging unit judges that the content parts are to be individually made usable, when the reading unit fails to read any of the pieces of management information, and

5 the program information generating unit does not generate the reconstruction program information, when the reconstruction judging unit judges that the content parts are to be individually made usable.

10 5. The storage media management apparatus of Claim 2, wherein

each piece of management information includes alteration information indicating whether a corresponding content part has been altered in a disconnected-state where a storage medium  
15 storing the corresponding content part is being disconnected,

the reconstruction judging unit judges that the content parts are to be individually made usable, when alteration information included in any of the pieces of management information read by the reading unit indicates that a  
20 corresponding content part has been altered in the disconnected-state, and

the program information generating unit generates, for each piece of management information read by the reading unit, individual program information for presenting a corresponding  
25 content part as an individual program, when the reconstruction

judging unit judges that the content parts are to be individually made usable.

6. The storage media management apparatus of Claim 5,  
5 wherein

the alteration information includes (a) initial-state information that is a part of the reconstruction information and indicates an initial state of a corresponding content part and (b) current-state information that is a part of the  
10 individual information and indicates a current state of the corresponding content part, and

the initial-state information matching the current-state information indicates that the corresponding content part has not been altered in a disconnected-state where a storage medium  
15 storing the corresponding content part is being disconnected, and the initial-state information not matching the current-state information indicates that the corresponding content part has been altered in the disconnected-state.

20 7. The storage media management apparatus of Claim 2, wherein

each piece of management information includes alteration information indicating whether a corresponding content part has been altered in a disconnected-state where a storage medium  
25 storing the corresponding content part is being disconnected,

the reconstruction judging unit judges that the content parts are to be individually made usable, when alteration information included in any of the pieces of management information read by the reading unit indicates that a corresponding content part has been altered in the disconnected-state, and

the program information generating unit does not generate the reconstruction program information, when the reconstruction judging unit judges that the content parts are to be individually made usable.

8. The storage media management apparatus of Claim 7, wherein

the alteration information includes (a) initial-state information that is a part of the reconstruction information and indicates an initial state of a corresponding content part and (b) current-state information that is a part of the individual information and indicates a current state of the corresponding content part, and

the initial-state information matching the current-state information indicates that the corresponding content part has not been altered in a disconnected-state where a storage medium storing the corresponding content part is being disconnected, and the initial-state information not matching the current-state information indicates that the corresponding

content part has been altered in the disconnected-state.

9. The storage media management apparatus of Claim 2,  
further comprising

5 a presenting unit operable to present the content as being  
usable, when the program information generating unit generates  
the reconstruction program information for presenting the  
content.

10 10. The storage media management apparatus of Claim 9,  
further comprising

a medium configuration presenting unit operable to  
present information indicating which one of the storage media  
stores each content part.

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11. The storage media management apparatus of Claim 9,  
further comprising

a warning unit operable to, when a storage medium storing  
one of the content parts is to be disconnected, warn that the  
20 content is made unusable after the disconnection.

12. The storage media management apparatus of Claim 9,  
wherein

each piece of management information includes total  
25 number information indicating a total number of the content

parts, and

the storage media management apparatus further comprises  
a usable proportion presenting unit operable to present  
a proportion of (a) content parts stored in storage media that  
5 have been connected and (b) content parts not stored in the  
storage media that have been connected, among all the content  
parts a number of which is equal to the total number indicated  
by the total number information.

10 13. The storage media management apparatus of Claim 1,  
wherein

the individual information includes at least an  
identifier for uniquely identifying a corresponding content  
part, and position information indicating a position at which  
15 the corresponding content part is stored in a storage medium,  
and

the reconstruction information includes at least an  
identifier for uniquely identifying the content, total number  
information indicating a total number of the content parts,  
20 and sequence number information indicating a sequence number  
given to a corresponding content part among sequence numbers  
given sequentially to all the content parts.

14. The storage media management apparatus of Claim 1,  
25 wherein

the dividing unit does not divide the content when a data amount of the content is smaller than a capacity of an unused storage area of one of the storage media, and divides the content into the plurality of content parts when the data amount of the content is larger than a capacity of an unused storage area of each of the storage media, and

the writing unit writes each content part to a different one of the storage media, when the dividing unit divides the content, and writes the content to a storage media that has an unused storage area whose capacity is larger than the data amount of the content, when the dividing unit does not divide the content.

15. The storage media management apparatus of Claim 14, wherein

the writing unit includes a selecting unit operable to select a storage medium whose unused storage area has the largest capacity among the plurality of storage media, and

the writing unit writes one of the content parts to the storage medium selected by the selecting unit when the dividing unit divides the content, and writes the content to the storage medium selected by the selecting unit when the dividing unit does not divide the content.

16. The storage media management apparatus of Claim 1,



wherein

each piece of management information includes  
presetting-condition information indicating a condition of  
presetting on which writing of a corresponding content part  
5 is based,

the writing unit includes

a same-condition detecting unit operable to detect, when  
the content is written based on presetting, a same-type content  
whose presetting-condition information indicates a same  
10 condition of presetting as indicated by presetting-condition  
information corresponding to the content, and

the writing unit writes one of the content parts to a  
storage medium storing the same-type content detected by the  
same-condition detecting unit when the dividing unit divides  
15 the content, and writes the content to the storage medium storing  
the same-type content detected by the same-type detecting unit  
when the dividing unit does not divide the content.

17. The storage media management apparatus of Claim 1,  
20 further comprising:

an available area judging unit operable to judge whether  
both of a first storage medium and a second storage medium have  
unused storage areas; and

an available area adjusting unit operable to, when both  
25 of the first storage medium and the second storage medium have

unused storage areas and both of the first storage medium and the second storage medium respectively store two of the content parts, move one content part stored in one of the first storage medium and the second storage medium to another one of the first  
5 storage medium and the second storage medium.

18. A storage media management method for use in a storage media management apparatus to and from which a plurality of storage media are connected and disconnected, the method  
10 comprising:

a dividing step of dividing a content into a plurality of content parts, for storing the content as being divided into a plurality of storage media;

a management information generating step of generating  
15 a plurality of pieces of management information in correspondence to the content parts, each piece of management information including (a) reconstruction information for reconstructing the content by concatenating a corresponding content part with the other content parts, and (b) individual  
20 information for making the corresponding content part individually usable;

a writing step of writing each content part together with a corresponding piece of management information, to a different one of storage media; and

25 a reconstruction judging step of judging, when a content

part stored in one of the storage media is to be used, whether the content is to be reconstructed and made usable, or the content parts are to be individually made usable, based on the piece of management information stored in each storage medium.

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19. The storage media management method of Claim 18, further comprising:

a reading step of reading the pieces of management information from storage media that have been connected to the storage media management apparatus; and

a program information generating step of generating, based on reconstruction information included in each piece of management information read in the reading step, reconstruction program information for presenting the content as one program, when a judgment result in the reconstruction judging step shows that the content is to be reconstructed and made usable.

20. The storage media management method of Claim 19, wherein

a judgment result in the reconstruction judging step shows that the content parts are to be individually made usable, when any of the pieces of management information is failed to be read in the reading step, and

in the program information generating step, individual program information for presenting a corresponding content part

as an individual program is generated for each piece of management information read in the reading step, when a judgment result in the reconstruction judging step shows that the content parts are to be individually made usable.

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21. The storage media management method of Claim 19, wherein

a judgment result in the reconstruction judging step shows that the content parts are to be individually made usable, when  
10 any of the pieces of management information is failed to be read in the reading step, and

in the program information generating step, the reconstruction program information is not generated, when a judgment result in the reconstruction judging step shows that  
15 the content parts are to be individually made usable.

22. The storage media management method of Claim 19, wherein

each piece of management information includes alteration  
20 information indicating whether a corresponding content part has been altered in a disconnected-state where a storage medium storing the corresponding content part is being disconnected from the storage media management apparatus,

a judgment result in the reconstruction judging step shows  
25 that the content parts are to be individually made usable, when

alteration information included in any of the pieces of management information read in the reading step indicates that a corresponding content part has been altered in the disconnected-state, and

5           in the program information generating step, individual program information for presenting a corresponding content part as an individual program is generated for each piece of management information read in the reading step, when a judgment result in the reconstruction judging step shows that the content  
10 parts are to be individually made usable. .

23. The storage media management method of Claim 22, wherein

the alteration information includes (a) initial-state  
15 information that is a part of the reconstruction information and indicates an initial state of a corresponding content part and (b) current-state information that is a part of the individual information and indicates a current state of the corresponding content part, and

20           the initial-state information matching the current-state information indicates that the corresponding content part has not been altered in a disconnected-state where a storage medium storing the corresponding content part is being disconnected from the storage media management apparatus, and the  
25 initial-state information not matching the current-state

information indicates that the corresponding content part has been altered in the disconnected-state.

24. The storage media management method of Claim 19,  
5 wherein

each piece of management information includes alteration information indicating whether a corresponding content part has been altered in a disconnected-state where a storage medium storing the corresponding content part is being disconnected  
10 from the storage media management apparatus,

a judgment result in the reconstruction judging step shows that the content parts are to be individually made usable, when alteration information included in any of the pieces of management information read in the reading step indicates that  
15 a corresponding content part has been altered in the disconnected-state, and

in the program information generating step, the reconstruction program information is not generated when a judgment result in the reconstruction judging step shows that  
20 the content parts are to be individually made usable.

25. The storage media management method of Claim 24,  
wherein

the alteration information includes (a) initial-state  
25 information that is a part of the reconstruction information

and indicates an initial state of a corresponding content part and (b) current-state information that is a part of the reconstruction information and indicates a current state of the corresponding content part, and

5           the initial-state information matching the current-state information indicates that the corresponding content part has not been altered in a disconnected-state where a storage medium storing the corresponding content part is being disconnected from the storage media management apparatus, and the  
10   initial-state information not matching the current-state information indicates that the corresponding content part has been altered in the disconnected-state.

26. The storage media management method of Claim 19,  
15   further comprising

          a presenting step of presenting, to a user of the storage media management apparatus, the content as being usable, when the reconstruction program information for presenting the content is generated in the program information generating step.

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27. The storage media management method of Claim 26, further comprising

          a medium configuration presenting step of presenting, to the user, information indicating which one of the storage  
25   media stores each content part.

28. The storage media management method of Claim 26, further comprising

a warning step of warning the user, when a storage medium  
5 storing one of the content parts is to be disconnected, that the content is made unusable after the disconnection.

29. The storage media management method of Claim 26, wherein

10 each piece of management information includes total number information indicating a total number of the content parts, and

the storage media management method further comprises  
a usable proportion presenting step of presenting, to  
15 the user, a proportion of (a) content parts stored in storage media that have been connected to the storage media management apparatus and (b) content parts not stored in the storage media that have been connected to the storage media management apparatus, among all the content parts a number of which is  
20 equal to the total number indicated by the total number information.

30. The storage media management method of Claim 18, wherein

25 the individual information includes at least an



identifier for uniquely identifying a corresponding content part, and position information indicating a position at which the corresponding content part is stored in a storage medium, and

5           the reconstruction information includes at least an identifier for uniquely identifying the content, total number information indicating a total number of the content parts, and sequence number information indicating a sequence number given to a corresponding content part among sequence numbers  
10       given sequentially to all the content parts.

31. The storage media management method of Claim 18, wherein

          in the dividing step, the content is not divided when  
15       a data amount of the content is smaller than a capacity of an unused storage area of one of the storage media, and the content is divided into the plurality of content parts when the data amount of the content is larger than a capacity of an unused storage area of each of the storage media, and

20           in the writing step, each content part is written to a different one of the storage media, when the content is divided in the dividing step, and the content is written to a storage media that has an unused storage area whose capacity is larger than the data amount of the content, when the content is not  
25       divided in the dividing step.

32. The storage media management method of Claim 31,  
wherein

the writing step includes:

5 a selecting substep of selecting a storage medium whose  
unused storage area has the largest capacity among the plurality  
of storage media; and

a largest unused area writing substep of writing one of  
the content parts to the storage medium selected in the selecting  
10 substep when the content is divided in the dividing step, and  
writing the content to the storage medium selected in the  
selecting substep when the content is not divided in the dividing  
step.

15 33. The storage media management method of Claim 18,  
wherein

each piece of management information includes  
presetting-condition information indicating a condition of  
presetting on which writing of a corresponding content part  
20 is based, and

the writing unit includes:

a same-condition detecting substep of detecting, when  
the content is written based on presetting, a same-type content  
whose presetting-condition information indicates a same  
25 condition of presetting as indicated by presetting-condition

information corresponding to the content; and

a same-condition writing substep of writing one of the content parts to a storage medium storing the same-type content detected in the same-condition detecting substep when the content is divided in the dividing step, and writing the content to the storage medium storing the same-type content detected in the same-type detecting substep when the content is not divided in the dividing step.

34. The storage media management method of Claim 18, further comprising:

an available area judging step of judging whether both of a first storage medium and a second storage medium have unused storage areas; and

an available area adjusting step of, when both of the first storage medium and the second storage medium have unused storage areas and both of the first storage medium and the second storage medium respectively store two of the content parts, moving one content part stored in one of the first storage medium and the second storage medium to another one of the first storage medium and the second storage medium.

35. A storage media management program that enables a computer to and from which a plurality of storage media are connected and disconnected, to execute the steps of:

dividing a content into a plurality of content parts;  
generating a plurality of pieces of management  
information in correspondence to the content parts, each piece  
of management information including (a) reconstruction  
5 information for reconstructing the content by concatenating  
a corresponding content part with the other content parts, and  
(b) individual information for making the corresponding content  
part individually usable;

writing each content part together with a corresponding  
10 piece of management information, to a different one of storage  
media; and

judging, when a content part stored in one of the storage  
media is to be used, whether the content is to be reconstructed  
and made usable, or the content parts are to be individually  
15 made usable, based on the piece of management information stored  
in each storage medium.

36. A system LSI that controls a storage media management  
apparatus, wherein

20 the system LSI executes the storage media management  
program of Claim 35.